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ALKYLATED VERDAZYLS AS INITIATORS FOR CONTROLLED/LIVING POLYMERIZATION

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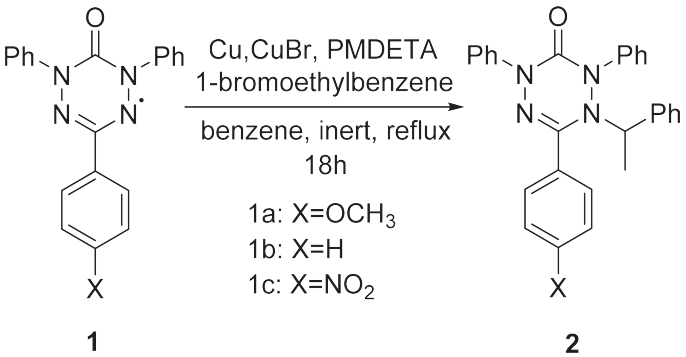
Nowadays, the controlled living polymerization has drawn much attraction in the field of preparation and design of novel polymer materials. The widespread applicability of living radical polymerization is explained by the broad opportunities in the preparation of polymers with the precise control of molecular weight and narrow molecular weight distribution. To date, , nitroxides are the most effective and well-studied initiators for the initiation of polymerization. They allow synthesizing a polymer with desired properties as well as carrying out the polymerization at mild conditions [1, 2]. At the same time, other types of radicals have been studied poorly that offers opportunities for search new initiators for controlled/living polymerization.

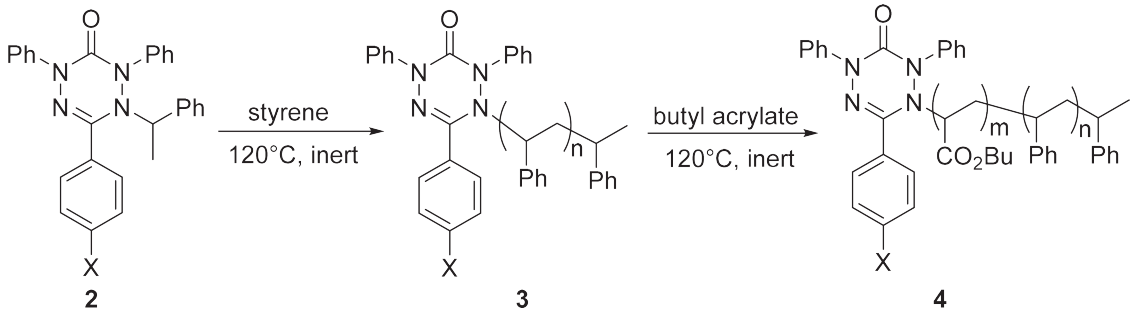
We focused on 6-oxoverdazyls that have the same high stability as nitroxides at storage and during the polymerization process [3]. In addition, the presence of three aromatic substituents in the structure of the molecule allows us to finely tune the properties of initiators by electronic and steric effects influence.

Thus, the aim of this research is the preparation and evaluation of alkylated verdazyl radicals **2** as initiators of controlled living polymerization. First, radicals **1** were synthesized according to our recently developed pathway [4]. Further, alkylated verdazyls **2** with electron-donating and electron-withdrawing groups (scheme 1) were obtained taking into account method of alkoxyamines synthesis [5].

The next step is the implementation of initiators **2a–c** in thermal polymerization of styrene. As a result, it was found that the polymerization is con-



Scheme 1. *Synthesis of alkylated 6-oxoverdazyls 2*



Scheme 2. *Polymerization with initiators 2*

trolled in the case of all three alkyl verdazyls. To study living character of the process, macroinitiator **3** was used for butyl acrylate polymerization. As a result, co-polymer **4** was obtained.

To sum up, the principal possibility of using alkylated verdazyl radicals as initiators for controlled living polymerization was shown. It was found that nature of C3-substituents does not effect on polymerization results. Further, we plan to vary monomer applied as well as to perform photoinduced polymerization.

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THE STUDY OF FEEDSTOCK AND PRODUCTS OF CATALYTIC CRACKING AND HYDROCRACKING

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Today, there are many advanced oil refining processes, but the main ones and the most common are catalytic cracking (CC) and hydrocracking (HC), due to their technological flexibility and versatility [1]. Hydrocracking is essentially a type of catalytic cracking carried out in a hydrogen environment. The main advantage of hydrocracking over catalytic cracking is the production of more

Table 1. Feedstock density and molecular weight

Hydrocracking				Catalytic cracking			
UH-1	MW	g/mol	256.2	SD-1	MW	g/mol	142.3
	Den	g/cm³	808.5		Den	g/cm³	946.0
UH-2	MW	g/mol	221.8	SD-2	MW	g/mol	149.2
	Den	g/cm³	826.9		Den	g/cm³	969.3
UH-3	MW	g/mol	233.1	UG-1	MW	g/mol	96.0
	Den	g/cm³	790.4		Den	g/cm³	758.2
SD 200-360	MW	g/mol	241.8	UG-2	MW	g/mol	98.6
	Den	g/cm³	825.2		Den	g/cm³	761.1
2nd line feed	MW	g/mol	315.7	feed 1	MW	g/mol	341.3
	Den	g/cm³	906.7		Den	g/cm³	892.7
2nd stage feed	MW	g/mol	367.6	feed 2	MW	g/mol	342.1
	Den	g/cm³	836.2		Den	g/cm³	889.9
1st line feed	MW	g/mol	357.7	feed 3	MW	g/mol	338.5
	Den	g/cm³	914.5		Den	g/cm³	890.6

here Den – density; UH – unstable hydrogenate; SD – summer diesel; UG – unstable gasoline